Exhibit 6

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

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This Document Applies to:

City of Fresno (Plaintiff) Case No. 04 CV-04973 (SAS)

v.

Chevron U.S.A. Inc., et al (Defendants)

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AMENDED EXPERT REPORT OF JOHN B. O'BRIEN

Date: November 21, 2011

that implemented compromises reached as a result of the negotiations.[65]

64. To clarify the terminology associated with the 1990 CAAA gasoline regulations, and as used in this Report, gasoline made to meet the requirements of the OFP is referred to as "oxygenated" gasoline, while gasoline made to meet the requirements of the RFG program is referred to as "reformulated" gasoline, or simply RFG. Both of these grades of gasoline were required to contain minimum levels of oxygen through the addition of oxygenates, as described above.[66] Gasoline sold in areas not covered by either the OFP or RFG programs was not required to contain oxygenates and is referred to as "conventional" gasoline. However, conventional gasoline may, and often does, contain oxygenates depending on logistics, octane requirements, and processing economics. Also, so-called "anti-dumping" regulations preclude refiners from simply blending ("dumping") all of their most highly polluting components into conventional gasoline. Following the January 1995 introduction of RFG, there was a period of regulatory overlap between the OFP and RFG programs when RFG was required to contain 2.7 Wt.% oxygen (instead of 2 Wt.%) during the winter months in OFP areas. This was done to avoid having two conflicting fuel regulations in areas covered by both OFP and RFG.

CARB Reformulated Gasoline Regulations

65. CARB was formed by the California legislature in 1968 to find solutions to California's air pollution problems. Since its establishment, CARB has often been in the forefront of the development of automobile emission controls. In 1971, CARB adopted the nation's first automobile emissions standards for oxides of nitrogen. In 1975, exhaust catalytic

[65] Michael Weisskopf, "Rare Pact Reached to Fight Smog; Environmentalists, Oil Firms Agree on Gasoline Standards," *The Washington Post*, August 16, 1991, p. 1.

[66] The requirement that RFG contain a minimum oxygen content was lifted in May 2006, after Congress passed the RFS mandating that the domestic gasoline supply contain certain minimum volumes of blendstocks made from renewable sources.

converters were required on all new cars sold in California under CARB's Motor Vehicle Emission Control program. In 1988, CARB adopted regulations requiring all new cars sold in the state to have onboard computer-controlled emission monitoring systems.

66. However, CARB's most significant statewide gasoline regulations occurred when Phase I of the California Reformulated Gasoline (CaRFG1) program became effective on January 1, 1992. CaRFG1 totally eliminated the use of lead additives, mandated the use of deposit control additives, and in some areas of the state, extended the new federal RVP limits for longer time periods.

67. For federal OFP-designated areas, California obtained an EPA waiver to use gasoline containing between 1.8 and 2.2 Wt.% oxygen, instead of the standard federal level of 2.7 Wt.% for wintertime OFP gasolines.[67] Also, when the federal OFP program commenced in November 1992, CARB required the entire state to comply with the wintertime oxygenate program because approximately 80% of the state's gasolines were marketed in areas that were non-attainment for CO according to federal regulations.[68] This statewide wintertime oxygenate requirement started in November 1992 and terminated in February 1998. However, CARB required certain selected counties and areas of the state to continue their wintertime oxygenate use even though they were CO-compliant. For example, the counties of Fresno, Madera, and the Lake Tahoe Air Basin were required to continue wintertime oxygenate use through January 2000, even though they had achieved CO-compliance in June 1998.[69] The CARB wintertime oxygenate target of 2.0 Wt.% oxygen was equivalent to 11.0 Vol.% MTBE or 5.7 Vol.% ethanol.

[67] The waiver was requested as part of California's State Implementation Plan (SIP). Data showed that oxygen levels above 2.2 Wt.% increased nitrogen oxide emissions and added to ozone and particulate matter pollution.
[68] James D. Boyd, CARB, Letter to Daniel W. McGovern, EPA, October 30,1992, regarding revisions to California's SIP for compliance with the federal OFP program.
[69] See 63 FR 15305 and year 2000 version of Title 13, California Code of Regulations, Section 2262.5 (13 CCR 2262.5).

In his report in this matter, Plaintiff's expert Mr. Reynolds incorrectly states that CARB's wintertime oxygenate requirements only applied to Greater Los Angeles and Imperial County.[70] In fact, they applied throughout the state for several years.

68. CARB Phase II (CaRFG2) gasoline regulations were promulgated in October 1991 and became effective on March 1, 1996, 15 months after the federal RFG regulations were implemented. The CaRFG2 regulations were more stringent than those for federal Phase I RFG and substantially lowered the sulfur dioxide, nitrogen oxides, and VOC emissions compared to Phase I RFG. The emissions behavior of CaRFG2 gasoline was estimated based on CARB's own "predictive model" and measured the emissions compliance of each gasoline blend based on its RVP, aromatics, olefins, sulfur, benzene, oxygen, and distillation. CaRFG2 gasoline sulfur content was limited to 30 parts per million (ppm) using the averaging method of compliance versus an average level of 130 ppm for federal RFG. In order to meet the tougher emission requirements, the average level of aromatics and olefins in CaRFG2 gasoline also had to be lower than typical federal RFG.

69. Because CaRFG2 was more restrictive than federal RFG, it was allowed to supersede federal requirements. Most CaRFG2 gasoline was targeted to contain 2.0 Wt.% oxygen year-round, with an allowable compliance range of between 1.8 and 2.2 Wt.%.[71] Although CaRFG2 was required statewide, some areas of the state were subject to the requirements of the federal OFP and RFG programs as well. Exhibit H shows the counties in California that were subject to the federal OFP or RFG programs, or both, at any time during the

[70] Reynolds Fresno Report, May 2, 2011, Section 4.2, p. 7.

[71] If gasoline suppliers complied with the CARB emissions requirements under the predictive model, they were permitted to produce gasoline without oxygenates if they so chose (except in RFG-designated areas.) The oxygenate requirement only applied to suppliers complying under the so-called "flat limits" of 1.8 to 2.2 Wt.%. See 13 CCR 2262. Although small amounts of non-oxygenated CaRFG2 were produced between 1996 to 2003, high refining costs precluded any significant volumes. CaRFG2 also allowed 10 Vol.% ethanol blends with a maximum of 3.7 Wt.% oxygen.

period from 1995 to 2003. In December 2001, the counties in the San Joaquin Valley Air Basin[72] were designated by the federal government as ozone non-attainment areas and, effective December 2002, these counties were required to meet federal RFG requirements.[73]

70. CaRFG2 specifications proved very difficult for refiners to meet and required numerous modifications to refinery facilities. Difficulties in obtaining the necessary construction permits in the highly regulated California environment added time and cost to the necessary refinery modification projects. CARB-compliant gasoline became the most expensive in the nation and its availability from sources outside the state was very limited.

71. CARB Phase III (CaRFG3) gasoline regulations became effective December 31, 2003, the same time that the state's MTBE phaseout was complete. Because CaRFG3 gasoline used in federal RFG areas was still required to contain 2.0 Wt.% oxygen, completion of the MTBE phaseout was effectively a mandate for the use of 5.7 Vol.% ethanol (the only CARB-approved source of oxygen) in those gasolines.[74] CaRFG3 also lowered the levels of sulfur and benzene permitted in gasoline and slightly adjusted distillation temperature limits.

72. Despite recent federal mandates to increase the blending of ethanol into all domestic gasoline supplies, the 5.7 Vol.% ethanol level was retained in all California gasolines until January 1, 2010, when the state's Low Carbon Fuel Standard (LCFS) was passed into law.[75] Although the LCFS did not specifically mandate an increase in ethanol blending, increasing the ethanol content from 5.7 to 10 Vol.% became, along with other adjustments in fuel quality, an

[72] The San Joaquin Valley Air Basin comprises the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulane, and western Kern County.
[73] See 66 FR 56476-484.
[74] See 13 CCR 2262.6.
[75] California's LCFS is aimed at reducing greenhouse gases from all of the state's energy sources.

integral part of California refiners' strategy to comply with the new law.

The Federal Renewable Fuel Standard ("RFS")

73. In August 2005, the federal government passed the Energy Policy Act of 2005, which included the first RFS. Commencing in May 2006, the first RFS required certain minimum volumes of ethanol to be used annually in the nation's fuel supply, at the same time eliminating any requirement for oxygenates in RFG. The intended purpose of the first RFS was to reduce dependence on foreign oil through increased use of domestic renewable fuels, reduce greenhouse gas emissions, and support new domestic economic activity in renewable fuels production. In December 2007, the federal government passed the Energy Independence and Security Act of 2007 (EISA), which substantially expanded the RFS requirements for the nationwide blending of fuels from renewable sources.[76] As of the time of this Report, minimum oxygen requirements remain only in certain OFP regulated areas.[77] However, all such oxygen is currently provided through ethanol blending.

V. GASOLINE SUPPLY CHAIN OVERVIEW

74. The gasoline "supply chain" is the entire set of interdependent activities that are carried out to bring gasoline to the end user. The supply chain is very complex, highly regulated, intensely competitive, and involves a large number of business relationships. The business relationships exist throughout the entire supply chain—from the refiner, blender, or importer to the retail service station operator. Exhibit I is a diagram showing the complexity of the

[76] EISA increased the annual volume of renewable fuels (including ethanol) required in the U.S. motor fuel supply to 36 billion gallons by the year 2022, or approximately 2,350,000 barrels per day (B/D). Of that total, only a maximum of 15 billion gallons per year (BGY), or approximately 978,500 B/D of corn-based ethanol can be used to meet RFS requirements.

[77] See 13 CCR 2262.5(a). The remaining OFP areas are the South Coast Area (Los Angeles and Orange Counties, as well as parts of Riverside and San Bernardino Counties) and Imperial County.

out" of the gasoline pool in California is to export them or burn them as refinery fuel—providing a low economic value. The net result is a loss in total gasoline volume.

193. Third, and finally, the energy content of ethanol is less than that of either hydrocarbon gasoline or MTBE. It is approximately one-third less than hydrocarbon gasoline and about 20% less than MTBE. Since a fuel's volumetric energy content is directly related to the mileage that can be achieved in an internal combustion engine, substitution of hydrocarbon gasoline or MTBE with ethanol requires that more fuel volume be burned for the same miles driven. The net effect is the same as for the removal of light ends from gasoline—the incremental gasoline volume must be made up by refiners processing more crude oil or through gasoline imports.

194. If refiners must process more crude oil to produce the same volume of gasoline, the cost of producing gasoline increases. Increased imports of gasoline not only increase the cost of the gasoline supplies, but also raise important issues regarding long-term security of supply. Although the impact of ethanol on gasoline supply may vary, both on a refiner to refiner and on a temporal basis, it would have been clear to most refiners considering alternative oxygenate materials in the early 1990s that ethanol would negatively impact their overall gasoline production and make them less competitive from a pricing standpoint.

Summary of MTBE versus Ethanol Considerations

195. Each gasoline refiner was faced with the decision of how and where to source the large volumes of oxygenates that were projected to be required in RFG and OFP designated areas. As has been explained in this Report, there were many factors to be considered in making this decision. Although there were a number of different types of ethers and alcohols that could be used, the fundamental choice was between MTBE and ethanol. For many of the reasons

discussed above, most refiners generally opted for MTBE. The following paragraphs summarize the key issues that directed that decision.

196. **Ethanol Availability** – Most ethanol plants were small, inefficient, highly leveraged, and concentrated in the Midwest corn producing states, far removed from the areas of largest future RFG/OFP demand. There were few ethanol plants being planned or under construction because the economics did not justify it. Ethanol imports were limited by a tariff and by the "cap" on CBI nation volumes. In contrast, capacity for MTBE was growing rapidly, both at refineries and through merchant plant construction. The latter relied on low-cost butanes, the very materials that were rapidly being displaced from the gasoline pool due to restrictive RVP regulations.

197. **Ethanol Distribution and Blending** – Ethanol's water miscibility precluded it from being blended at the refinery and transported by pipeline. Reliance on ethanol as the source of oxygenate in major East Coast and West Coast RFG markets would have resulted in substantial rail transportation costs, as well as major new investments in segregated rail off-loading facilities, terminal storage tanks, and truck rack loading and blending systems. Ethanol's high blending RVP required refiners to produce a special low RVP RBOB (or CARBOB in California), complicating the refining process, adding additional expense, and reducing gasoline volume. The latter could only be made up by processing more crude oil or importing high-cost gasoline from foreign sources. When the EPA denied requests to provide ethanol-blended RFG gasoline with an RVP "waiver" (which it gave for conventional gasoline), any plans for new ethanol capacity essentially came to an end.[171] In denying the waiver, the EPA was concerned that the expanded use of ethanol in RFG gasolines would increase emissions in those areas that

[171] "Ethanol Producers Battle EPA Proposal on Clean Air," *The Wall Street Journal*, May 1, 1992, p. 84.

already had the "dirtiest" air. When asked about this fact at trial in the City of New York Case, Mr. Reynolds confirmed, "*I believe that's why they* [the EPA] *said they would not grant it* [the waiver] *for all their RFG areas, yes.*"[172] In comparison, both inside and outside of the refinery, MTBE behaved like any other refinery gasoline blendstock and did not suffer from any excessive RVP, blending, transportation, or distribution problems.

198. **Ethanol Economics** – Even with the help of generous federal subsidies, the cost of producing ethanol in the early 1990s made it only marginally competitive with other oxygenate sources, such as MTBE. Additional state subsidies or incentives were needed to encourage expanded production. Ethanol's fundamental economics, with a high dependency on corn prices, raised uncertainty about the long-term viability of the ethanol industry. In 1994, the U.S. General Accountability Office (GAO), the audit arm of the U.S. Congress, reported that despite a federal law requiring large federal agencies to use renewable fuels, the agencies had substantially failed to comply.[173] The high price of ethanol was cited as a key reason. MTBE, in contrast, was not only much cheaper to produce, but also offered economic synergies with other refinery processes such as alkylation. Also, MTBE production costs were directly related to other energy costs, not based on the price of a totally unrelated farm crop and agricultural by-products the way ethanol was.

199. **Supply Reliability and Quality Control** – If a refiner chose ethanol as its oxygenate source, it often had to enter into a contract with a relatively small supplier with an unknown "track record." A refiner did not want to be dependent on oxygenate sourced from potentially unreliable suppliers operating in an economically challenged, subsidized industry.

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[172] Reynolds Trial Testimony, City of New York Case, p. 4715, lines 12-13.

[173] *Advanced Technology Program - Federal Agencies' use of Gasohol Limited by High Prices and Other Factors*, U.S. GAO, Report to the Honorable Byron L. Dorgan, U.S. Senate, December 1994.

The refiner was essentially taking on the risk of default in supply, the cost of which could be substantial. However, refiners themselves had no interest in owning or operating ethanol plants, which represented an entirely different line of business. The choice of ethanol also introduced issues of product quality control. RFG regulations required that gasoline meet all specifications at the point of retail delivery to the consumer. By choosing ethanol as the oxygenate source, refiners were, in effect, transferring part of the gasoline manufacturing process—the need to blend the correct volume of ethanol just prior to delivery—to entities over which they had little or no control. Unlike ethanol, MTBE could be reliably manufactured and blended at the refinery and the final blend certified at the time of production, in accordance with strict quality control procedures. Absent some unusual pipeline or terminal operating problem, the refiner knew that the product delivered to the retail station met the RFG regulations. The use of MTBE offered more product quality assurance and less risk of violation of those regulations.

200. **Consumer Acceptance** – Because ethanol had been linked to various fuel quality and vehicle performance issues when initially used, a perception had arisen that ethanol-blended fuels were inferior and to be avoided. MTBE bore no such consumer acceptance problems. Indeed, by 1990, MTBE had been proven to be an economic, easily used, high-octane, and reliable gasoline blendstock that could be blended, transported, and delivered like any other gasoline blendstock.

VII. COMPARISON OF ETHANOL CIRCUMSTANCES TODAY VS. THE 1990s

201. It has often been asserted that the fact that ethanol is in such widespread use in the U.S. today is ample proof that all U.S. refiners and marketers could have, if they had chosen to, met the oxygenate requirements of the 1990 CAAA using ethanol alone. I do not agree with this

assertion. The technical and commercial circumstances 15-20 years ago were very much different than they were in the early to mid-2000s when U.S. refiners started to transition from MTBE to ethanol. Of course, no one can know for certain what could have been accomplished 15-20 years ago. However, given that ethanol producers and refiners would at that time have had, at best, only three to four years to build a large number of new ethanol plants, as well as substantially modify both refineries and distribution systems to accommodate ethanol on a nationwide basis, I find it unreasonable to assume that such a rapid expansion of the ethanol industry could have been achieved. Ethanol blending confronted gasoline suppliers with a multiplicity of risks, uncertainties, and added costs in the early 1990s. To assume that suppliers would have simply ignored such factors is, in my opinion, unrealistic.

202. Instead, I am of the opinion that individual refiners did exactly what can be anticipated from any competitive business enterprise. They kept their options open until they knew what the actual regulations would be and then made the most prudent investments and/or operational changes needed to ensure that they remained competitive in their markets. Since MTBE held so many technical and economic advantages over ethanol, and entailed much lower supply risk, it is not surprising that it became the oxygenate of choice outside the Midwest ethanol production areas. It is unreasonable to assume that refiners would have made large investments to expand RBOB production, or potential ethanol suppliers would have invested in large new production facilities, when neither knew the role that ethanol would eventually play in meeting the 1990 CAAA. Gasoline marketing is highly competitive. Each refiner was faced with an individual decision as to which federally approved oxygenate to use. As discussed in more detail in this section, an individual refiner facing such a choice would also be aware that its competitors were facing a similar choice. It would be reasonable for a refiner to assume that its

Conclusion

229. In my opinion, it is totally improper to consider what has been achieved in the ethanol and the refining industries over the last 15-20 years and conclude that the same could have been achieved during the implementation of the 1990 CAAA. Conditions were simply too different across many dimensions. The dynamics of the entire industry were vastly different during the two periods, and there was simply too much uncertainty in the earlier periods to encourage the level of change and investment needed. When individual refiners considered their choice between ethanol and MTBE, it was typically made on the basis of competition, overall economics, and security of oxygenate supply. Since MTBE was generally favored in all categories, it is not surprising that most refiners chose it over ethanol. MTBE phaseouts and ethanol mandates were key drivers in the transition from MTBE to ethanol in the mid-2000s. No such issues were foreseen in the earlier time frames.

VIII. DIMINISHING PUBLIC AND POLITICAL SUPPORT FOR ETHANOL

230. Over the last few years, both public and political support for the expanded use of corn to produce additional fuel ethanol has waned considerably. This has come about as a greater proportion of the population has come to understand the additional costs and unintended consequences of the large-scale use of ethanol in motor fuel. Even former Vice President Al Gore, who was once one of the most ardent advocates of fuel ethanol, has come out against expanded corn ethanol production. He now admits that the benefits of ethanol are "*trivial*."[210] Asked to explain his previous support for ethanol, the former Vice President said, "*One of the reasons I made that mistake* [i.e., supporting corn ethanol] *is that I paid particular attention to*

[210] "Al Gore's Ethanol Epiphany," *The Wall Street Journal*, November 27, 2010.

December 31, 2011. Elimination of the VEETC would not reduce the quantity of ethanol blended into gasoline since this is mandated by law. However, discontinuance of the VEETC has the potential to significantly alter the economics of ethanol producers.

I reserve the right to amend these opinions if subsequent information becomes available which would materially alter my findings.

JOHN B. O'BRIEN

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